

CLAIMS

What is claimed is:

1. A method to reduce torque ripple and audible noise in an electric machine, the method comprising:

initiating a rotation of said electric machine at a determinable velocity;

detecting at least one phase voltage signal indicative of a back electromotive force (BEMF) for a selected phase;

synthesizing at least one waveform indicative of said BEMF for each phase of said electric machine; and

scaling a command to said electric machine based on said at least one waveform.

2. The method of claim 1 further including equalizing said at least one waveform to compensate for magnitude and frequency variations therein.

3. The method of claim 1 further including storing said at least one waveform in memory to facilitate later computations.

4. The method of claim 1 further including compensating said at least one waveform to correlate its frequency to that of a command associated with a selected operational speed of said electric machine.

5. The method of claim 1 further including compensating said at least one waveform to correlate its magnitude to that of a command associated with an operational speed of said electric machine.

6. The method of claim 5 wherein said compensating includes modulating said command based on said at least one waveform.

7. The method of claim 1, wherein when the electric machine is connected to the electronic control circuit, the electronic control circuit is operative to control the electric machine having one or more magnetic components.

8. The method of claim 7, wherein the electric machine is a brushless DC (BLDC) motor and the electronic control circuit includes at least four inverter transistors configured to operate said motor.

9. The method of claim 1, wherein said command is configured to control said electric machine to maintain speed.

10. A system to reduce torque ripple and audible noise in an electric machine comprising:

an electric machine in operable communication with a control circuit;

said electronic control circuit configured to generate a voltage command to control each phase of said electric machine and including a controller; and

wherein said controller is configured to: detect at least one phase voltage signal with said electric machine rotating at a determinable speed, yet unexcited, indicative of a back electromotive force (BEMF) for a selected phase; synthesize at least one waveform indicative of said BEMF for each phase of said electric machine; and scale a command to said electric machine based on said at least one waveform.

11. The system of claim 10 further including said controller equalizing said at least one waveform to compensate for magnitude and frequency variations therein.

12. The system of claim 10 further including said controller storing said at least one waveform in memory to facilitate later computations.

13. The system of claim 10 further including said controller compensating said at least one waveform to correlate its frequency to that of a command associated with a selected operational speed of said electric machine.

14. The system of claim 10 further including said controller compensating said at least one waveform to correlate its magnitude to that of a command associated with an operational speed of said electric machine.

15. The system of claim 14 wherein said compensating includes modulating said command based on said at least one waveform.

16. The system of claim 10, wherein when the electric machine is connected to the electronic control circuit, the electronic control circuit is operative to control the electric machine having one or more magnetic components.

17. The system of claim 16, wherein the electric machine is a brushless DC (BLDC) motor and the electronic control circuit includes at least four inverter transistors configured to operate said motor.

18. The method of claim 10, wherein said command is configured to control said electric machine to maintain speed.

19. A storage medium encoded with a machine-readable computer program code, said code including instructions for causing a computer to implement a method to reduce torque ripple and audible noise in an electric machine, the method comprising:

- initiating a rotation of said electric machine at a determinable velocity;
- detecting at least one phase voltage signal indicative of a back electromotive force (BEMF) for a selected phase;
- synthesizing at least one waveform indicative of said BEMF for each phase of said electric machine; and
- scaling a command to said electric machine based on said at least one waveform.